



# FIRE DETECTION AND NOTIFICATION IN TRAINS USING GSM

Sneha Nair

Department of Electronics Engineering, Usha Mittal Institute of Technology (Autonomous), Mumbai, India.

## ABSTRACT

Fire accidents occur in most of public transport which causes loss for human life and government property. There are a number of way to avoid fire and thus decrease loss. Fire caused in running train dangerous because of wind helps spread the fire. This time delay between the accident and first responders to be dispatched. Thus, decreasing the time delay and ceasing fire from spreading is necessary, hence these system is created. The proposed system have lot of advantage like less costs, communicating with passengers, latest technologies, easy to reach large number of people, dynamic and effective way, send important information at proper time for proper mass. The system is implemented by using microcontroller, sensors, fire station, GSM technology to detect fire and cease it with effect to extinguish fire by water sprinkler.

**KEYWORDS:** ATMEGA 8 microcontroller, GSM wireless technology, Sensors, buzzer, LCD display.

## 1. INTRODUCTION:

Fire on a running train dangerous than on stationary one. When these accidents occur at night or any remote places, the damage is high. The damage is heavier due to improper reach a service. So there comes a necessary of an autonomous fire detection systems. These systems work on quick detection of fire, alert the passengers extinguishing by water sprinkler. Railway accidents such as collisions, fire accidents, trains run out of rails happen all over in recent times. There is an urgent need to stop a fire as soon as it starts. A smart and efficient system needs to be developed one of such system of GSM technology which is used which helps to enable communication between trains and fire station.

Though GSM the fire station would receive a message and thus fire brigade would proceed with the rescue operation. So appropriate help can arrive before the trains and passengers are in danger.

This system using the technologies GSM which could help to reduce the accidents related to fire in a moving train and one of an efficient way to decrease the damage.

## 2. LITERATURE SURVEY:

In 1960's smoke detectors started increasing their popularity. In early 1970's there was changed from the old life safety systems to new one. Indian railways developed the fire as well as smoke detection system on all the compartments for the safety of passengers life. The system has an ability for checking and giving alert sound to the passengers at initial stages. Thereby giving some time for shifting into the safe areas. The fire and smoke detection system based on the early stage of smoke, the fire sensor which would detects the smoke or fire at the initial stage through the continuous point to point sampling and also see the change in compartments environment.

## 3. EXISTING METHOD:

In existing system mostly all controlled manually in those. Also the properties of trains cannot withstand temperature rise and heat of fire It is the manual operation which leads to risk for human lives and thus increases time delay. Due to such time delay, the fire will spread thereby increases damages to both lives and properties. Hence the new method was proposed to extinguish the fire and make people alert.

## 4. PROPOSED METHODOLOGY:

In the system sensor microcontroller are the main elements. Along with these, there are other elements such as the buzzer, an LCD 16\*2 display, relay and the GSM SIM 800 modem. There are sensor smoke (MQ2) and temperature sensor (LM35). There are 4 sensors of temperature and smoke per bogies. This proposed work to develop automatic fire detection and stop fire as soon as possible. In order to provide an early extinguishing of fire, sensors measures temperature and heat concentrations are deployed in the train. When there is the detection of fire, alarm sound simultaneously, the information reports their fire station via GSM.

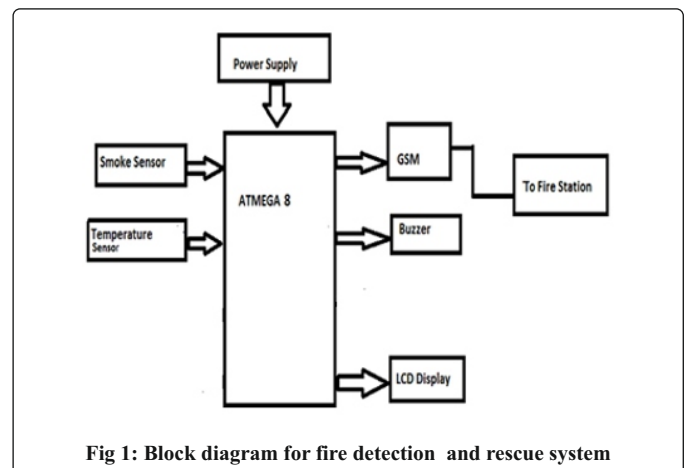


Figure 1 shows the block diagram of a system and its every component. This design uses GSM technology which is renowned and well known for mobile communication. The person receives the message when the fire is detected through GSM modem SIM800. Fire detection system can be implemented with help of ATMEGA 8 and GSM technology. The sensors such as smoke and temperature are connected to the controller.

The controller continuously checks the values from all the sensors. If the values are exceeded range it will send the signal to GSM network. The person receives the message sent by GSM and decides necessary action.

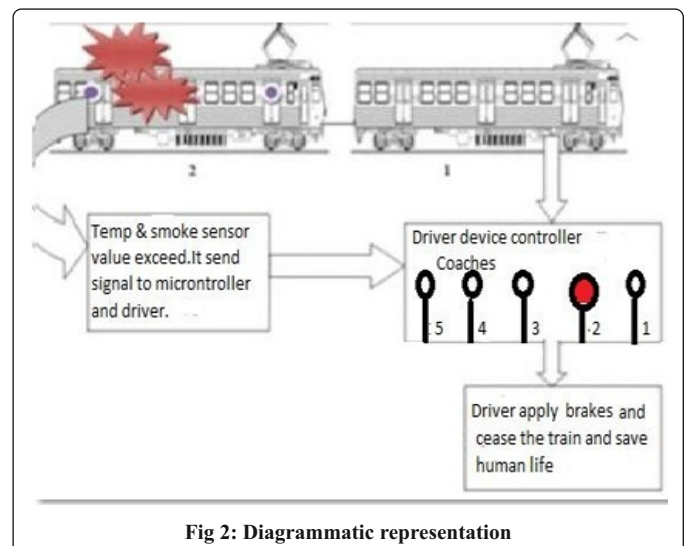
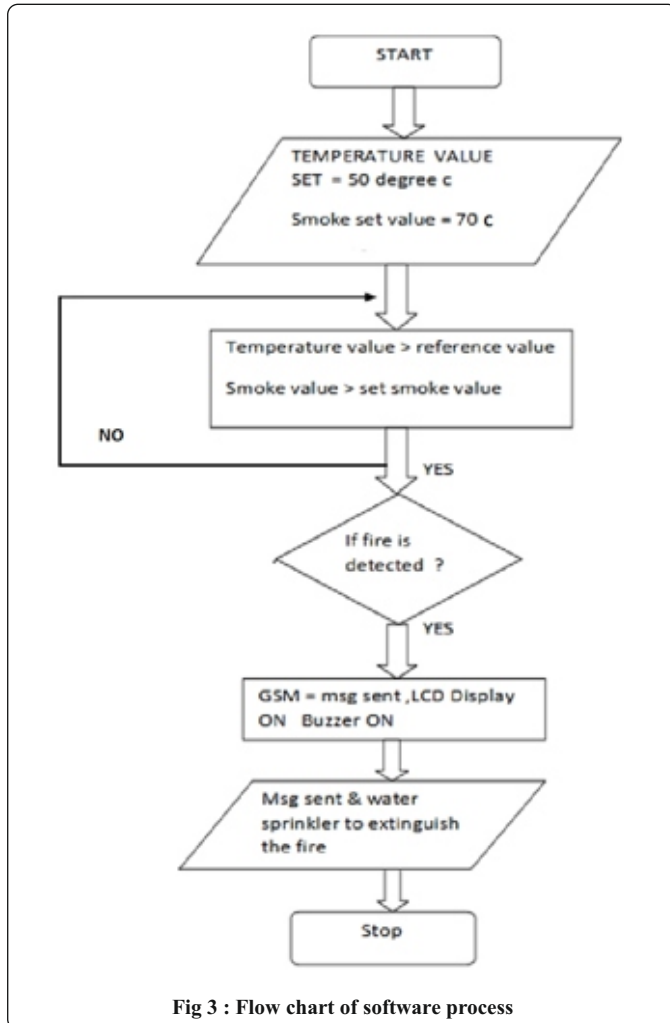


Fig 2 shows the diagrammatic representation of the whole process when fires occur in trains and smoke, the temperature sensor is placed at start and end of each bogie.

#### SOFTWARE FLOW:

Fig 3 shows the flowchart of the software process. The input of the system is the sensor, where reading is taken given to the microcontroller for the ADC conversion and output system, is the display of Liquid Crystal Display (LCD). The software process helps to display the message in mobile with help of GSM only when the microcontroller is activated and value from sensors like the temperature sensor and smoke sensor exceeds value from the set value, the microcontroller will send an alarm to GSM and it will be activated. The device will also indicate the LED lights to show the path. LCD display loco pilot to stop the train then it will turn to extinguish the fire, water sprinkler on and emergency door opened.



#### 4. RESULT AND DISCUSSION:



Fig 8: Layout of PCB

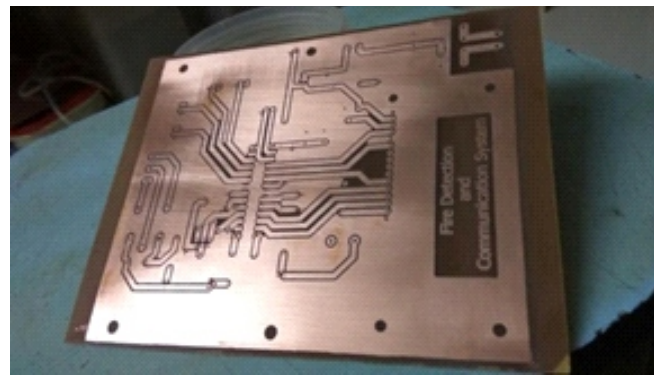


Fig 9 :Tracks of PCB

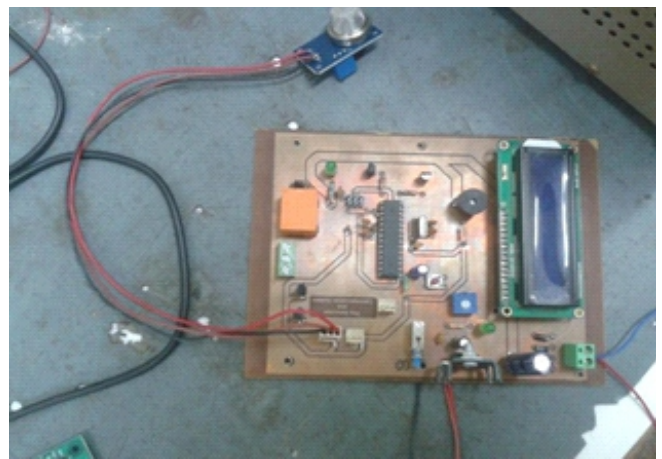


Fig 10: Experiential Setup when sensors are connected to microcontroller.



Fig 11: Design module GSM when connected to microcontroller.

The fig 11 shows sensor senses and send signal to microcontroller which give signal to GSM to activate.





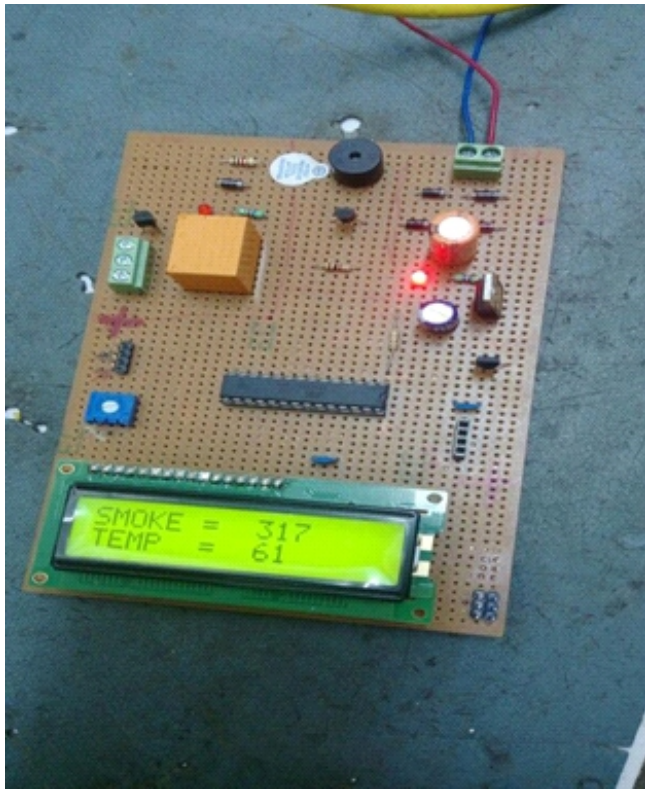


Fig 12: Design output Module when "Fire Detected" on LCD screen with train number also smoke and temperature reading on fire station circuit.



Fig 13: Output reading (2) on fire station circuit.

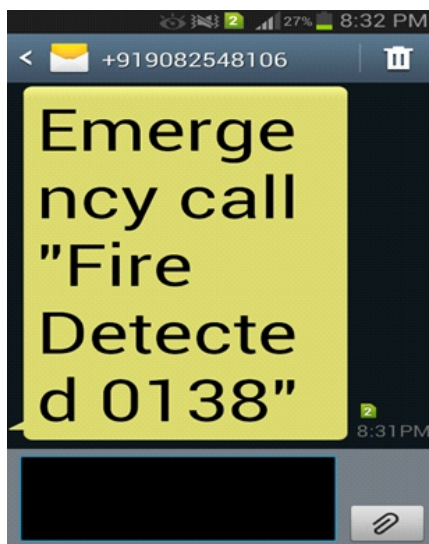


Fig 13: Message received to firestation and passengers.

#### REFERENCES:

1. K. Abdul Rasim, S. P. Kesavan . "Advanced smoke detection for Railways". IJARIE- ISSN (O), Vol-2 Issue-2 2016.
2. Rajesh, N.N.Ramesh and S.M.Prakhy . "Wireless vehicular accident detection and notification system". International conference on mechanical and electrical technology, 2010.
3. Guan Q, Yu F R, Jiang S, Leung V and Mehrvar H. "Topology Control in Mobile ad hoc Networks with cooperative communications". IEEE Wireless Commun., Vol. 19, No.2, pp. 7479, (2016).
4. P. Poobalan, N. NAresh, G. Rajesh, B. Maheswaran, Aswin Vinod. "GPS and GSM based Accident Location Indicator and Rescue System". in Journal of the International Association of Advanced Technology and Science volume 16, March 2015.
5. Ramprasath P S, Sairam K, Sivaraman N, Prof D. Shanthi Chelliah. "Rapid Fire Intimation System for Railways Using Wireless Sensor Network, in International Journal of Advanced Research In Electronics And Communication Engineering". (IJAREE) volume 11, Issue 3, March 2015.

#### 5. CONCLUSION:

An automatic fire detection system based on GSM. The proposed system shows provides early extinguishing of a fire accident to decrease damages. The safety and security for life is gain through this system. The safety is against fire and bring human being in safe areas. The main aim is to design and implement a effortable system for automatic fire detection and also make aware to passengers about the fire accident and also take quick action by organization center.